In the Claims:

Please cancel claims 1-27.

Please add new claims 28-45 as follows:

28. (New) A method of simultaneously genotyping multiple samples in a single round of hybridization, the method comprising:

1) incubating a microarray of polynucleotide samples with a probe mixture of oligonucleotides of known sequence, wherein

a) the microarray contains a plurality of classes of polynucleotides with each class of polynucleotides in a distinct location,

b) each class of polynucleotides has polynucleotides with a defined segment containing a marker selected from a marker for a gene and markers for one or more allelic variants thereof,

c) the oligonucleotides in the mixture consist essentially of oligonucleotides having sequences complementary to the defined segments of b) for each class of polynucleotides for which a genotype is to be determined, wherein the oligonucleotides complementary to a class of polynucleotides are selected from those with sequences complementary to (1) a defined segment of a gene, (2) defined segments of one or more allelic variants of the gene, and (3) a defined segment of a gene and defined segments of one or more allelic variants of the gene, and also consisting essentially of, optionally, control oligonucleotides,

d) the incubating allows the formation of hybrids comprised of polynucleotides of the array and complementary oligonucleotides and allows discrimination at single nucleotide resolution; and

2) detecting stable hybrids formed during the incubation, if any, wherein the formation of a hybrid or lack of formation of a hybrid after a single round of hybridization is indicative of a genotype .

29. (New) The method of claim 28 wherein the polynucleotide samples of the microarray are amplification products.

30. (New) The method of claim 29, wherein the amplification products are produced by a polymerase chain reaction (PCR) method.

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31. (New) The method of claim 30 wherein the plurality of classes of polynucleotides is at least 10.

32. (New) The method of claim 28 wherein an allele of the gene is associated with a disease.

33. (New) The method of claim 32 wherein the disease is a human disease.

34. (New) The method of claim 32 wherein the gene is human and is selected from the group consisting of β-globin, Cystic Fibrosis Transmembrane Conductance Regulator (CFTR), and Galactose-1-Phosphate Uridyltransferase (Gal-1-PU).

35. (New) The method of claim 28 wherein the microarray is on a surface containing at least 1000 locations per square centimeter.

36. (New) The method of claim 28 wherein the mixture of oligonucleotides of known sequence comprises oligonucleotides with ten different sequences.

37. (New) The method of claim 28 wherein the oligonucleotides in the mixture are between about 10 and 30 nucleotides in length.

38. (New) The method of claim 28 wherein the distinct segment is between about 40 and about 1000 nucleotides.

39. (New) The method of claim 28 wherein the incubating is in an aqueous solution comprised of salts and detergent.

40. (New) The method of claim 28 wherein hybridizing is performed at a temperature about 10 °C below the melting temperature of the stable hybrids.

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41. (New) The method of claim 28 wherein the oligonucleotides of known sequence are labeled.

42. (New) The method of claim 41 wherein the label is fluorescent.

43. (New) The method of claim 28, wherein samples from homozygotes and samples from heterozygotes are distinguishable.

44. (New) The method of claim 28 wherein the plurality of classes of polynucleotides is at least 5,000.

45. (New) The method of claim 28 wherein the individual specimens are neonatal blood samples.